

ILLUMINATION SYSTEM WITH SPATIALLY CONTROLLABLE
PARTIAL COHERENCE COMPENSATING FOR LINE WIDTH
VARIANCES IN A PHOTOLITHOGRAPHIC SYSTEM

ABSTRACT OF DISCLOSURE

An illumination system used in photolithography for the manufacture of semiconductors having an array optical element with different illumination regions corresponding or matched to different line width variations printed on a photosensitive substrate. The array optical element may be a filter, diffractive optical element, or micro lens array having illumination regions producing different types of illumination properties or characteristics. Each of the illumination regions are matched or correspond to a respective region on the reticle to provide optimized exposure of a photosensitive resist covered wafer. The optical element of the present invention may be used to tailor a conventional illumination system to the unique characteristics of the projection optics used in the photolithographic system, thereby compensating for vertical and horizontal bias or variations in line width for features oriented in the vertical and horizontal direction. This facilitates the manufacture of semiconductor devices with small feature sizes while improving quality and increasing yield.

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